Hardiness commitment, gender, and age
differentiate university academic performance

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**Background.** The increasing diversity of students, particularly in age, attending university has seen a concomitant interest in factors predicting academic success.

**Aims.** This 2-year correlational study examined whether age, gender (demographic variables), and hardiness (cognitive/emotional variable) differentiate and predict university final degree grade point average (GPA) and final-year dissertation mark.

**Sample.** Data are reported from a total of 134 university undergraduate students.

**Method.** Participants provided baseline data in questionnaires administered during the first week of their second year of undergraduate study and gave consent for their academic progress to be tracked. Final degree GPA and dissertation mark were the academic performance criteria.

**Results.** Mature-age students achieved higher final degree GPA compared to young undergraduates. Female students significantly outperformed their male counterparts in each measured academic assessment criteria. Female students also reported a significantly higher mean score on hardiness commitment compared to male students. Commitment was the most significant positive correlate of academic achievement. Final degree GPA and dissertation mark were significantly predicted by commitment, and commitment and gender, respectively.

**Conclusions.** The findings have implications for universities targeting academic support services to maximize student scholastic potential. Future research should incorporate hardiness, gender, and age with other variables known to predict academic success.

The prediction of academic success has been traditionally associated with intelligence (Brody, 2000; Gottfredson, 2003; Kuncel, Hezlett, & Ones, 2001). However, an increasing number of contemporary studies have produced evidence for associations between personality and scholastic achievement (Chamorro-Premuzic & Furnham, 2003; Ferguson, James, O’Hehir, & Saunders, 2003; Paunonen & Ashton, 2001; Petrides, Chamorro-Premuzic, Frederickson, & Furnham, 2005). In particular, researchers have consistently reported the positive association between conscientiousness (one of the

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Big Five personality factors; Costa & McCrae, 1992) and academic performance (Busato, Prins, Elshout, & Hamaker, 2000; Chamorro-Premuzic & Furnham, 2003; Duff, Boyle, Dunleavy, & Ferguson, 2004; Furnham, Chamorro-Premuzic, & McDougall, 2003). Students scoring highly in conscientiousness are typically identified as being competent, dutiful, hard working, perseverant, and achievement striving (Ferguson et al., 2003; Komarraj & Karau, 2005). Given these ameliorative attributes, it is particularly noteworthy that studies (Maddi et al., 2002; Ramanaiah & Sharpe, 1999) have reported a positive relationship between conscientiousness and hardiness (Kobasa, 1979). However, to date, little research has looked at the possible moderating effect of the ‘hardy personality’ on academic performance.

**Hardiness and academic performance**

The hardiness construct, with its roots in existential theory (e.g. Frankl, 1959; Gendlin, 1966; Kierkegaard, 1849/1954), emerged from individual differences research on stress reactions, and has been conceptualized as a combination of the three attitudes (3Cs) of commitment, control, and challenge (Kobasa, 1979; Maddi, 2006). Hardiness provides the existential courage (Tillich, 1952) that aids the individual in pursuing the future despite its uncertainty (Maddi, 2004). Commitment (vs. alienation) epitomizes those individuals who are committed to and feel deeply involved in the activities of their lives. People high in commitment get involved rather than withdraw, seeing this as the best way to turn their environments and whatever they are experiencing into something that seems interesting, worthwhile, and important, regardless of how stressful things become (Maddi, 2006; Maddi et al., 2002). Control (vs. powerlessness) reflects people’s desire to continue to have an influence on the outcomes going on around them, no matter how difficult and stressful this becomes (Maddi, 2006). Hardy individuals control the events of their experience in terms of what they choose to do and how they choose to respond to various events (Maddi, 1990). Challenge (vs. security) typifies an expectation that life is unpredictable and that changes will stimulate personal development. Potentially stressful situations are appraised as exciting and stimulating rather than threatening, enabling people to feel positively about life’s fluctuations. People high in challenge believe that what improves their lives is growth through learning rather than easy comfort and security (Maddi, 2006).

According to Maddi and Khoshaba (2001), hardy individuals construct meaning in their lives by recognizing that (a) everything they do constitutes a decision, (b) decisions invariably involve pushing towards the future or shrinking into the past, and (c) choosing the future expands meaning, whereas choosing the past contracts it. Though positive in terms of meaning and possibilities, choosing the future raises anxiety over the unpredictable nature of things not yet experienced. To accept this so-called ontological anxiety and push ahead with choosing the future anyway requires the courage that is the manifestation of existentialist theory. Substituting courage with hardiness lends precision to the existential formulation by emphasizing the three interrelated beliefs about one’s interaction with the world: commitment, control, and challenge.

As conceptualized, the 3Cs of hardiness are a cognitive/emotional amalgam constituting a learned, growth-oriented, personality style. Hardiness theory submits that people who feel committed, in control, and positively challenged by life circumstances have the tendency to perceive events or circumstances as less stressful, seeing them as manageable rather than overwhelming (Khoshaba & Maddi, 1999). Performance of these individuals is enhanced by their active or decisive coping efforts in stressful
situations (Soderstrom, Dolbier, Leiferman, & Steinhardt, 2000). As such, hardiness is a pathway to resilience under stress (Bonanno, 2004). The positive influence of hardiness on performance has been reported in such diverse samples as athletes (Golby & Sheard, 2004; Golby, Sheard, & Lavallee, 2003; Sheard & Golby, 2006), human resource consultants (Maddi et al., 2006), and military personnel (Bartone & Snook, 1999).

That strong hardy attitudes in students are desirable is clear in that hardiness facilitates turning stresses to advantage, growing in such enhanced performance criteria as creativity, wisdom, and fulfilment, and maintaining or enhancing physical and mental health (Maddi, 2006). If hardy attitudes are strong, individuals will show an action pattern of coping with stressful circumstances (e.g. examinations, meeting course work deadlines, completing a final-year research project) by facing them (as opposed to being in denial), and striving to turn them from potential disasters into opportunities for self (rather than avoiding them) (Khoshaba & Maddi, 1999).

In the higher education setting, hardiness has been found to be critical to university retention and was a better predictor of retention than either Scholastic Aptitude Test (SAT) scores or class rank in high school (Lifton, Seay, & Bushke, 2000). Further, Maddi, Wadhwa, and Haier (1996) found that hardy students were less likely to try to cope with stressful circumstances by using alcohol and drugs. Otherwise, there is scant evidence, to date, of the validity of hardiness in the prediction of university academic performance. This is somewhat surprising, given the overwhelming evidence of the beneficial moderating effects of hardiness across a wide variety of occupations. Thus, the present study is timely.

**Age, gender, and academic performance**

Over the last decade, the university system in the United Kingdom has seen a massive expansion in higher education provision. National policy and funding arrangements advocating widened participation have seen a shift from elite to mass education (Hayes, King, & Richardson, 1997). One of the most noticeable changes has been an increase in the number of mature-age students (i.e. students who are aged 21 years or over at 30 September of the academic year in which they are studying) in the higher education population profile (Houltram, 1996). In the United Kingdom higher education system, students who are aged less than 21 years at 30 September of the academic year in which they are studying are called ‘young’ (Higher Education Statistics Agency [HESA], 2005). Indeed, 27.3% of all higher education students in the United Kingdom enrolled on full-time first degrees in 2003 were over the age of 21 years on entry to university (HESA).

Research in the area of age group differences and performance in sport and exercise courses is scarce. However, a host of recent nursing-related studies have tended to show mature-age students achieving better academic grades than their younger counterparts (El Ansari, 2002, 2003; Kevern, Ricketts, & Webb, 1999; Ofori, 2000; van Rooyen, Dixon, Dixon, & Wells, 2006), which could relate well to sport and exercise. In higher education generally, mature-age students have outperformed young students in first-year academic performance (McKenzie & Gow, 2004), across 3 years of study (Cantwell, Archer, & Bourke, 2001), and have been reported to obtain considerably more First Class and Upper Second Class degrees than younger students (Hoskins, Newstead, & Dennis, 1997). Factors that have been suggested to contribute to this finding include the higher levels of achievement motivation and conscientiousness (McKenzie & Gow, 2004), willingness to work (Hoskins et al., 1997), persistence (Richardson, 1995), critical reflection (Burrows, 1995), and internal locus of control and self-efficacy (McKenzie & Gow, 2004).
of older students. An explanation for this may be due to mature-age students’ perception of their present situation as a last chance at developing a career (Murray-Harvey, 1993). Mature-age students often see education as a catalyst for change in their lives and feel a tremendous pressure to succeed (Shanahan, 2006). Additionally, strong endorsement of learning goals (Eppler & Harju, 1997; McKenzie & Gow, 2004; Nunn, 1994) and a greater level of confidence due to their experience of life and the world of work (Shanahan, 2006) appear to distinguish mature-age students. It may also be that they are sufficiently assertive not to avoid one-to-one contacts or discussions with lecturers and tutors, thus fostering a deep approach to studying (Ofori, 2000). Thus, mature-age undergraduates, in contrast to younger students, appear to try to work out the meaning of information for themselves, do not accept ideas without critical examination of them, relate ideas from their studies to a wider context, and look for reasons, justification, and logic behind ideas (Sadler-Smith, 1996). Given these findings, it was hypothesized that, in the present study, (a) mature-age students would outperform young students in measured academic performance criteria and (b) higher levels of hardiness would be observed in mature-age students than in young students.

Another demographic variable that appears to discriminate students’ academic achievement is gender. Female students made up 58% of the first-year university undergraduate population in 2003 (HESA, 2004), and there is increasing evidence that this particular group is outperforming its male counterparts. For example, research has shown female undergraduate grade point average (GPA) to be higher than that achieved by male students after the first year of study (Strahan, 2003), and across 3 years of undergraduate study (Baker, 2003; Woodfield, Jessop, & McMillan, 2006). Female medical students also generally show better academic performance than males (Ferguson, James, & Madely, 2002). Studies have found that female students appear to adapt more easily to the contemporary higher education’s discourses and accepted learning behaviours (Smith, 2004). This includes being generally more motivated towards and to readily engage with academic goals and activities (Baker, 2003; Reisberg, 2000; Wintre & Yaffe, 2000), displaying a more self-determined motivational profile (Vallerand & Bissonnette, 1992), adhering to study schedules (Hofman & van den Berg, 2000), and a tendency to have higher levels of desire to finish university and persistence (Allen, 1999) than male students. In sum, much of the extant literature appears to be in agreement that the learner identity of female students is one that leads them to work harder and more consistently (Woodfield et al., 2006). Given these findings, it was hypothesized that, in the present study, (a) female students would outperform male students in measured academic performance criteria and (b) higher levels of hardiness would be observed in female students than in male students.

The first aim of the present study was to examine the differential influence of age and gender affecting hardiness and academic achievement. The second aim was to examine the extent to which hardiness was related to academic performance. The third aim of this study was to examine simultaneously the predictability of the criterion variables by hardiness attitudes, age, and gender.

### Method

#### Participants

Participants were full-time sport and exercise students, in one cohort, from an urban university in the northeast of United Kingdom who successfully completed their 3-year
undergraduate degrees in the summer of 2006. Predictors of academic achievement were examined in a sample of 134 target participants (88 young students, 46 mature-age; 78 male, 56 female; mean age = 20.87 years, $SD = 2.66$), who were those among an original sample of 169 undergraduates with sufficiently complete data for the present analyses, as described below. Participants read for a degree in one of five routes within the sport and exercise programme (viz., coaching science [$N = 31$], sports studies [$N = 32$], sports therapy [$N = 51$], applied exercise science [$N = 8$], and applied sport science [$N = 12$]). All students were fluent English speakers. Data for each participant were collected through 2 academic years (2004/2006).

**Targets and informants**
Using methods recommended in the extant literature (cf. Wagerman & Funder, 2007), to deal with missing data, all participants in the larger sample who were lacking either of the criterion variables (i.e. final degree GPA, dissertation mark) were dropped (reducing the $N$ from 169 to 134). Failure to submit a dissertation ($N = 14$) and failure to progress successfully from Year 2 to Year 3 ($N = 21$) accounted for the 35 participants removed from the data analysis because of missing data, leaving the final $N = 134$ for target participants. Means and standard deviations for the predictor variables in this smaller sample were comparable to those of the larger group from which they were drawn. Levene’s test ($p > .05$) revealed homogeneity of variance between the target and withdrawn participant subgroups. Independent sample $t$ tests conducted on the predictor variables revealed no significant differences (Table 1).

**Table 1.** Means, standard deviations, and summary of $t$ values of participants’ hardiness by satisfaction of criterion variables ($N = 169$)

<table>
<thead>
<tr>
<th>Predictor variables</th>
<th>Target informants ($N = 134$)</th>
<th>Withdrawn from analysis ($N = 35$)</th>
<th>$t$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commitment</td>
<td>15.34 2.19</td>
<td>15.71 2.36</td>
<td>0.90</td>
<td>.37</td>
</tr>
<tr>
<td>Control</td>
<td>9.62 2.26</td>
<td>10.34 1.83</td>
<td>1.75</td>
<td>.08</td>
</tr>
<tr>
<td>Challenge</td>
<td>12.24 1.84</td>
<td>12.43 1.56</td>
<td>0.56</td>
<td>.58</td>
</tr>
<tr>
<td>Total hardiness</td>
<td>37.19 4.55</td>
<td>38.49 4.34</td>
<td>1.51</td>
<td>.13</td>
</tr>
</tbody>
</table>

**Measures**
Under the university’s regulations, first-year module marks do not contribute towards final degree GPA and subsequent classification. The second and third years of study have a 25 and 75% weighting, respectively, on the final degree GPA. Therefore, hardiness data were collected in the first week of the participants’ second academic year and academic performance was monitored from the beginning of Year 2 of participants’ degree programme. Upon degree completion, academic performance and hardiness data were collected from the university archive by the author.
Hardiness

Hardiness was assessed by the use of the Personal Views Survey III-R (PVS III-R; Maddi & Khoshaba, 2001). The PVS III-R is an 18-item scale that yields a total hardiness score (a composite of the scores of the three subscales), as well as scores for the 3 six-item subscales: commitment, control, and challenge. Item examples include, for commitment, ‘I often wake up eager to take up life wherever it left off; It’s hard to imagine anyone getting excited about working’, for control, ‘Trying your best at what you do usually pays off in the end; When I make plans, I’m certain I can make them work’, and for challenge, ‘Changes in routine provoke me to learn; I am not equipped to handle the unexpected problems of life’. Scores were recorded on a 4-point Likert scale anchored by ‘not at all true’ and ‘very true’. Higher scores indicate desirable levels of hardiness. Total hardiness norms range from 19 to 49, with an average of 38–41 (Maddi & Khoshaba, 2001). Studies have shown the PVS III-R to have acceptable internal consistency (.70–.75 for commitment, .61–.84 for control, .60–.71 for challenge, and .80–.88 for total hardiness; Maddi & Khoshaba, 2001; Maddi et al., 2002). Collectively, intra-correlation coefficients among the hardiness 3Cs were significant, commitment/control ($r = .49$, $p < .001$), or approached significance, commitment/challenge ($r = .15$, $p = .08$), and control/challenge ($r = .16$, $p = .06$).

The PVS III-R consistently shows the 3Cs as intercorrelated in adult, high school, and undergraduate samples (Maddi & Khoshaba, 2001).

Academic performance

The present study utilized a correlational design that allowed an examination of the moderating effects of age and gender demographics, and student hardiness on academic performance. In keeping with most studies of personality and academic achievement (cf. Duff et al., 2004; Farsides & Woodfield, 2003; Gerardi, 2005; Martin, Montgomery, & Saphian, 2006; Nonis, Hudson, Philhours, & Teng, 2005; Paunonen & Ashton, 2001; Wagerman & Funder, 2007; Wharrad, Chapple, & Price, 2003), the present study used GPA as the criterion variable. Final degree GPA was examined because it is a stable and reliable indicator over time (Fischer & Massey, 2007), and is a composite of Year 2 GPA and Year 3 GPA. It is interesting to note that Chamorro-Premuzic and Furnham (2003) employed students’ 6-month supervised final-year projects as a criterion variable. They found that final-year project marks were most significantly correlated with conscientiousness, and that this personality factor was also a significant predictor of project marks. Given the relationship between conscientiousness and hardiness (Maddi et al., 2002; Ramanaiah & Sharpe, 1999), similarly, in the present study, academic performance was assessed also through a 9-month supervised final-year project (henceforth, referred to as dissertation).

The decision to use only two academic performance measures was based on Pearson product-moment correlations ($r$), which revealed positive and statistically significant ($p < .001$) relations between Year 2 GPA/Year 3 GPA = .75; Year 2 GPA/final degree GPA = .84; Year 2 GPA/dissertation mark = .63; Year 3 GPA/final degree GPA = .96; Year 3 GPA/dissertation mark = .78; final degree GPA/dissertation mark = .79. These correlations demonstrate the sufficiency and reliability of final degree GPA and dissertation mark as indicators of academic performance.

In all cases, assessments were recorded as percentages. Academic performance was calculated by averaging the percentages achieved in yearly assessments. Students were assessed using a valid and well-distributed variety of methods (i.e. essays, examinations, laboratory reports, seminar workshops, continuous assessment). Final assessment was
then calculated by averaging Year 2 and Year 3, adhering to the 25:75% ratio weighting mentioned previously. GPA (final degree classification equivalent in parentheses) for all routes was achieved by formulae approximately designating an ‘A’ (First) to students obtaining final assessment percentages of 70% or above, a ‘B’ (2.1) to students obtaining final assessment percentages between 60 and 69%, a ‘C’ (2.2) to students with final percentages of 50–59%, a ‘D’ (3rd) to students with final percentages of 40–49%, ‘borderline fail’ (pass degree) to students with final percentages between 35 and 39%, and ‘fail’ (fail degree) to students with final percentages below 35%.

Dissertation performance was assessed by a single mark for a 9-month final-year research project, elaborated under the supervision of a member of academic staff and double-blind marked by the supervisor and a second member of academic staff (and moderated by an external examiner). Dissertations were classified similarly to degrees. A dissertation awarded a mark of 70% or above was designated as an ‘A’, 60–69% as a ‘B’, 50–59% as a ‘C’, 40–49% as a ‘D’, 35–39% as a ‘borderline fail’, and below 35% as a ‘fail’. It is noteworthy that no academic staff or external examiners had any information about the participants’ hardiness scores.

Procedure
Permission from all appropriate university authorities to collect data and participants’ informed consent were obtained at the outset of the study. Individual participation was entirely voluntary. The nature of the data to be collected was explained to participants and they were advised that their progress throughout their time at the university would be monitored in terms of their grades. No students declined to participate in the study. No incentive for participation was offered. The PVS III-R was administered to students during a scheduled lecture in the first week of the second year of their degree study programme. Instructions were given both verbally and in writing, and students’ confidentiality was guaranteed. No time limit was imposed for the completion of the inventory, but average completion time was approximately 5 minutes.

Data analyses
Several of the academic performance and hardiness dependent variables were significantly ($p < .01$) intercorrelated. Therefore, adhering to recommendations from the extant literature (cf. Hair, Anderson, Tatham, & Black, 1998; Ramsey, 1982; Tabachnick & Fidell, 2007), data were analysed using univariate two-way analyses of variance (ANOVA). To establish specifically where differences existed, post hoc comparisons were made using the Dunn–Sidak method, which already has built-in protection to Type I error (Kirk, 1995). For the ANOVAs, age group (i.e. young student or mature-age student) and gender (i.e. male or female) served as the independent variables, while academic performance (i.e. final degree GPA, dissertation mark) and the hardiness 3Cs (i.e. commitment, control, and challenge) served as the univariate dependent variables. A separate two-way ANOVA was conducted for total hardiness, because it is a composite of the scores of the three hardiness components. The partial eta-squared ($\eta^2$) statistic estimated the effect size associated with each statistical difference (Heiman, 2002). Partial correlations were used to ascertain the extent of the relationship between hardiness and academic performance while controlling for the effect of age group and gender. Finally, hierarchical regression analyses were used to test the predictability of academic performance. Alpha was set at .05. All statistical analyses were conducted using SPSS for Windows v.13.0 (SPSS Inc., Chicago, IL).
Results

Descriptives

Partial correlations were conducted on the predictor variables. Significant correlations between gender and commitment ($r = .27, p = .001$), and hardness ($r = .17, p = .045$) were observed, when age group was partialled out. The relationship between age group and hardness (partiallyling out gender) approached significance ($r = .16, p = .06$). Other correlations between gender, age, and hardness were not significant.

Group differences

Gender, age, and academic performance

Means and standard deviations of all academic performance variables are presented in Table 2. Female students achieved a significantly higher mean final degree GPA, $F(1, 130) = 8.74, p = .004$, partial $\eta^2 = .06$, and dissertation mark, $F(1, 130) = 10.23, p = .002$, partial $\eta^2 = .07$. Mature-age students achieved a significantly higher mean final degree GPA, $F(1, 130) = 6.71, p = .01$, partial $\eta^2 = .05$, compared to young students.

Table 2. Means and standard deviations of academic performance by age group and gender

<table>
<thead>
<tr>
<th>Factors</th>
<th>Final degree GPA</th>
<th>Dissertation mark</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Age group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Young students (Y)</td>
<td>56.73</td>
<td>6.45</td>
</tr>
<tr>
<td>Mature-age students (M)</td>
<td>58.96</td>
<td>9.23</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male students (M)</td>
<td>56.32</td>
<td>7.55</td>
</tr>
<tr>
<td>Female students (F)</td>
<td>59.13</td>
<td>7.32</td>
</tr>
<tr>
<td>Age group X gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y X M (N = 53)</td>
<td>55.36</td>
<td>6.88</td>
</tr>
<tr>
<td>Y X F (N = 45)</td>
<td>58.04</td>
<td>5.78</td>
</tr>
<tr>
<td>M X M (N = 25)</td>
<td>57.49</td>
<td>8.25</td>
</tr>
<tr>
<td>M X F (N = 11)</td>
<td>63.62</td>
<td>10.97</td>
</tr>
</tbody>
</table>

Relative to dissertation mark, there were no significant age differences. No significant interactions were observed in either final degree GPA or dissertation mark.

Gender, age, and hardness

Means and standard deviations of the hardness attitudes are presented in Table 3. Female students scored higher in commitment, $F(1, 130) = 10.14, p = .002$, partial $\eta^2 = .07$, and total hardness, $F(1, 130) = 3.81, p = .05$, partial $\eta^2 = .03$, compared to their male counterparts. Relative to gender, there were no significant differences in control or challenge. No significant age differences or significant interactions were observed relative to the hardness 3Cs or total hardness.

Relationship between hardness and academic performance

A series of bivariate and partial correlations were computed on the data in order to test the relationship between the hardness 3Cs and academic performance. Correlation...
coefficients are presented in Table 4. As can be observed, commitment was the most significant positive correlate of academic performance, as measured by final degree GPA and dissertation mark. Gender was also a significant correlate of academic performance. When age group and gender were partialled out, the correlational pattern between hardiness and academic performance remained very similar. There were no significant control, challenge, or age group correlates of academic performance.

<table>
<thead>
<tr>
<th>Table 3. Means and standard deviations of hardiness by age group and gender</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hardiness</strong></td>
</tr>
<tr>
<td><strong>Factors</strong></td>
</tr>
<tr>
<td>Age group</td>
</tr>
<tr>
<td>Young students (Y)</td>
</tr>
<tr>
<td>Mature-age students (M)</td>
</tr>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>Male students (M)</td>
</tr>
<tr>
<td>Female students (F)</td>
</tr>
<tr>
<td>Age group × gender</td>
</tr>
<tr>
<td>Y × M (N = 53)</td>
</tr>
<tr>
<td>Y × F (N = 45)</td>
</tr>
<tr>
<td>M × M (N = 25)</td>
</tr>
<tr>
<td>M × F (N = 11)</td>
</tr>
</tbody>
</table>

**Table 4.** Correlations between hardiness, age group, gender, and academic performance criteria

<table>
<thead>
<tr>
<th>Final degree GPA</th>
<th>Dissertation mark</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Commitment</strong></td>
<td>.19* (.18**)</td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td>.11 (.09)</td>
</tr>
<tr>
<td><strong>Challenge</strong></td>
<td>-.14 (-.13)</td>
</tr>
<tr>
<td><strong>Age group</strong></td>
<td>.14</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td>.18*</td>
</tr>
</tbody>
</table>

*N = 134.*

*p < .05; **p < .01; ***p < .001.

(partialling out age group).

(partialling out gender).

**Predicting academic performance**

Hierarchical regression analyses were performed on the data of the whole sample (*N* = 134), in order to test the predictability of academic performance. In two different analyses (which alternated final degree GPA and dissertation mark as criteria), commitment was entered (block 1), followed by gender (block 2). Because control, challenge, and age group appeared to be having little effect on final degree GPA or dissertation mark, these predictor variables were left out of the regression analyses. Relative to the two hardness attitudes control and challenge, their exclusion also minimized the potential for multicollinearity, which occurs when highly correlated
predictor variables cause the full vector of regression coefficients to be poorly estimated and inflate the size of error terms, thus weakening the analysis (Dodge, 2003; Tabachnick & Fidell, 2007). Results showed that final degree GPA was significantly predicted by commitment, and dissertation mark by commitment and gender. These predictors accounted for 4 and 10% of the variances, of the respective academic performance criteria (Table 5).

Table 5. Summary of hierarchical regression analysis for variables predicting academic performance criteria (N = 134)

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Final degree GPA</th>
<th></th>
<th>Dissertation mark</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Predictor</td>
<td>St. β</td>
<td>t</td>
<td>St. β</td>
<td>t</td>
</tr>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commitment</td>
<td>0.19</td>
<td>2.17*</td>
<td>0.30</td>
<td>3.54***</td>
</tr>
<tr>
<td>F change(1, 132) = 4.72*</td>
<td></td>
<td>F change(1, 132) = 12.56***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj. R² = .03</td>
<td></td>
<td>Adj. R² = .08</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Step 2</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commitment</td>
<td>0.15</td>
<td>1.70</td>
<td>0.25</td>
<td>2.95**</td>
</tr>
<tr>
<td>Gender</td>
<td>0.15</td>
<td>1.68</td>
<td>0.18</td>
<td>2.10*</td>
</tr>
<tr>
<td>F change(1, 131) = 2.81</td>
<td></td>
<td>F change(1, 131) = 4.42*</td>
<td></td>
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</tr>
<tr>
<td>Adj. R² = .04</td>
<td></td>
<td>Adj. R² = .10</td>
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</table>

*p < .05; **p < .01; ***p < .001.

Discussion

The aims of this study were to examine; first, the differential influence of age and gender affecting hardiness and academic success; second, the extent to which the hardiness 3Cs (commitment, control, and challenge) related to academic performance; and, third, the extent to which these attributes predicted scholastic achievement over a 2-year period. Relative to the first aim, results suggested that mature-age students achieved greater academic success, as measured by final degree GPA, compared to young undergraduates. Female students significantly outperformed their male counterparts in both final degree GPA and dissertation mark. Female students also reported a significantly higher mean score on commitment compared to male students. With regard to the second aim of the present study, the commitment hardiness attitude was the most significant positive correlate of academic achievement. Gender was also a significant correlate of both academic performance criteria employed in the present study. Regarding this study’s third aim, final degree GPA and dissertation mark were significantly predicted by commitment, and commitment and gender, respectively.

Findings generally supported the present study’s hypotheses. Consistent with previous research in nursing (El Ansari, 2002, 2003; Kevern et al., 1999; Ofori, 2000; van Rooyen et al., 2006), this study reported the higher academic achievement of mature-age sport and exercise students over their younger counterparts. The findings of the present study conform to the body of higher education research (cf. Cantwell et al., 2001; Hoskins et al., 1997; McKenzie & Gow, 2004) that older students outperform young undergraduates. Specifically, mature-age female students achieved the highest mean score across all academic performance criteria. Though this finding was not significant, it is noteworthy that a differential exceeding a whole grade bandwidth
(i.e. >10 grade points) relative to dissertation mark separated mature-age female students from their young male counterparts.

Indeed, and also in keeping with previous findings (cf. Baker, 2003; Ferguson et al., 2002; Woodfield et al., 2006), female students in the present study significantly outperformed academically their male counterparts. However, overall, effect sizes were small (Cohen, 1988); gender explained only between 1 and 2% of the variance in final degree GPA and dissertation mark, respectively, of the whole sample.

Surprisingly, this study found no significant age difference in the hardiness 3Cs. Mature-age students' academic success may, therefore, be explained by attributes other than those manifested by hardness attitudes. Future research should investigate whether this finding emerges as a consistent result or as an artefact of the present sample. However, hardness gender differences were observed. In particular, female students' significantly higher levels of commitment intimate their superior ability to view academic work as important and worthwhile enough to warrant their full attention, imagination, and effort (Maddi & Khoshaba, 2005).

Commitment was the only hardness attitude significantly correlated with, and predictive of, academic achievement. It would appear that successful academic performance is related to, and can be predicted by, behaviour that reflects staying involved with events and people, even when situations become stressful (Maddi & Khoshaba, 2005). Students scoring highly in commitment are more likely to benefit academically from avoidance of unproductive alienating social behaviours.

This was evidenced particularly with regard to dissertation mark, where commitment accounted for 8% of the variance. The use of dissertations in university curricula has been seen as increasingly important and they are generally accepted as an effective means of research training for students (Marshall, 2001). Skills such as managing the generation and analysis of primary data (Marshall, 2001) and efficient time-management (Trueman & Hartley, 1996) reflect the relative autonomy afforded students engaged in dissertations. In addition, dissertations are also seen as an effective means of addressing concern to promote transferable skills, empowering the student, and providing student motivation (Marshall, 2001). The predictability of dissertation mark by commitment indicates the determined and dedicated attitudes required by undergraduate students to complete successfully a long-term academic project requiring intellectual investment. Given the clear emphasis dissertations place on the student taking responsibility for his/her learning, this was deemed an appropriate, and sufficiently distinct, criterion variable, in addition to final degree GPA, with which to examine the moderating influences of hardness, gender, and age.

Despite this, it is important to recognize that commitment explained only 3 and 8% of the variance in final degree GPA and dissertation mark, respectively. Gender added only an additional 1 and 2% variance explanation to the respective academic performance criteria. Therefore, relative differences in levels of commitment among undergraduates in this sample explained less variance in academic performance than conscientiousness in similarly designed studies (cf. Chamorro-Premuzic & Furnham, 2003; Furnham et al., 2003). In addition, there were no significant differences in the scores of hardness attitudes between those students who completed their degree studies and those who failed to satisfy programme progression criteria and were omitted from the final analyses. Thus, the present study's findings suggest that the influence of commitment, and of hardness in general, on academic success appears to be modest. Data collected from a larger sample of students, drawn from a broad range of disciplines, and from different academic institutions, may shed further light on the relationship
between commitment, gender, and academic performance. Further, using commitment as a predictor variable in conjunction with achievement motivation (cf. Busato et al., 2000; Mellanby, Martin, & O’Doherty, 2000) and conscientiousness (cf. Duff et al., 2004; Furnham et al., 2003) would offer evidence of the hardiness attitude’s incremental predictive validity with well-established predictors of academic success.

In conclusion, the findings of the present study suggest that students who are mature-age (i.e. ≥ 21 years at 30 September of the particular academic year of study), female, and rate highly in the hardiness attitude commitment are likely to perform better academically. Future studies may wish to extend this research by, for example, investigating further the moderating effects of age, gender, and hardiness on academic performance. Incorporating other variables known to predict academic success, for example, identity style (Berzonsky & Kuk, 2005), emotional intelligence (Austin, Evans, Goldwater, & Potter, 2005), learning environment (Entwistle & Peterson, 2004), student motivation (Pintrich, 2003), student learning approach and strategies (Entwistle & Ramsden, 1983), and self-efficacy (McKenzie & Schweitzer, 2001) may achieve this. Also, given the gender differential reported in the present study, hardiness theory may offer a further context within which to explore underlying reasons for undergraduate gender differences in, for example, attendance rates (Woodfield et al., 2006), perceived stress (Baker, 2003), and assessment method preference (Chamorro-Premuzic, Furnham, Dissou, & Heaven, 2005). Consequently, universities may then be sufficiently informed to provide appropriate higher education and support services in order to increase students’ chances of scholastic success.

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References


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